THE

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N. B:-Contributors are requested to send in their contributions typed or written legibly in ink on one side of the paper only.—Editor.

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Ourselves.

One year has passed since starting the publication of the Journal. We are glad to be able to issue the second volume. Financial conditions are so far satisfactory for successfully getting through the second year. The balance sheet of the Journal accounts for 1916—17 is published elsewhere. It should be gratifying to all interested in the journal that we are able to make the statement.

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We tender our thanks to the subscribers of last year for having encouraged us. We are confident that they will continue to subscribe for the current year's issue and look forward to them in getting us more subscribers. There are still several in the Forest Department alone who might become subscribers but have not done so owing perhaps to not knowing of the journal yet. It is needless to point out that with greater encouragement, further improvements will be easily possible.

We eagerly await contributions of articles and notes on interesting subjects of a professional nature to our Journal

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from outside. We make our appeal to all interested, as they can help us a good deal in this direction. It is quite possible to think of various subjects, especially at the present time, when there is scope for rapid development in all directions. Information of interest, though it may seem trivial may be of value. This Journal will be a suitable medium for publishing valuable facts and will serve, it is hoped, as a bureau of information.

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June has been a busy month in the College. It is the month of final examinations for the out-going students who have had their full course of training and annual examination for the Juniors. The anxious time spent by the Seniors at the end will only be apparent to those who have appeared for examinations and await results.

Prizes and certificates were distributed to the successful students on the 29th of June. Hon. Mr. M. E. Couchman, Commissioner of Forests, presided on the occasion. Mrs. C. D. McCarthy gave away the medals and certificates.

The following were the prize winners :—

1. S. Ramachandra Iyer, 1. Governmet prize for the best Senior Student.
   - „ 2. „ for the best Student in Forestry.
   - „ 3. „ Survey.
   - „ 4. „ Range Administration.
   - „ 5. Lodge prize for the best Student in Engineering.
   - „ 6. Principal's prize for the best Student in Botany.
   - „ 7. Campbell Walker's prize for the best all round Ranger.

2. N. Thiruvikraman Thampi, Brazier prize for the best out-door Ranger.

3. C. Srinivasa Rau, Board of Visitors' prize for the best Junior Student.

4. C. Karunakara Menon, Indian Forester prize for the best essay on Village Forests.

5. C. S. Nanjappa, Pentland Shield for the best all-round Athlete for the year.

The following is the order of merit of the Students who have obtained Certificates.

1. S. Ramachandra Aiyer, Honours.

Higher Standard Certificate.

2. K. Jayaraman.
3. C. S. Ramanathan.
4. N. T. Thampi.
5. M. R. Doraiswami Aiyer.
6. A. Manikka Mudaliar.
7. S. M. Srinivasagam Pillai.
8. D. E. Lewin.
9. P. Dhananjaya Rao.
10. K. Venkataramanan.
11. K. S. Raghavachar.
12. C. Karunakara Menon.
13. P. Karunakara Menon.
14. A. Subramania Aiyer.
15. T. Paramasivam Pillai.
16. L. A. Krishna Aiyer.
17. K. V. Krishnaswami Aiyengar.
18. M. Rama Rao Kini.
19. P. M. Mathew.
20. J. Ramalingam.

Lower Standard Certificate.

21. V. Mahadeva Aiyer.
22. N. Kesava Pillai.
23. K. Thiruvenkata Chari.
24. T. Balaramaswami.
25. B. Gulam Dastigir.
26. C. S. Nanjappa.
27. S A. Dawson.
28. P. V. Ramana Rao.

One Student failed to obtain any Certificate.

The Principal has in his report fully acknowledged the able management, in all directions, of Mr. C. E. C. Fischer who was Principal before him. "I say I think we can assure the Board that we are now in for a non-stop run without fear of accident and still less of a break-down." He has pointed out the urgent necessity for a Research Institute,

for the establishment of which the Madras Forest College affords full scope and facilities.

Turning to the students the Principal said, "Half of you are going out into the world to start your career in life. Never forget that the College is looking at you. The name of the College is in your hands, not in ours. That you may all attain success is the heartfelt wish of everyone of us here to-day. But some of you may not and what I want to impress upon you is that professional success is not everything; what is infinitely more important is the reflection. If you can honestly say towards the close of your career, that you have done your duty without fear and without favour, seeking no end but to do your work and to play the game and if you can lay your hands upon your heart can honesty make that avowal, then will you have gained for yourself the finest gift that this world has to offer, your own self-respect and the respect of those competent to judge you."

The Principal also referred to the College Journal started by Mr. Fischer which "if wisely conducted, should be of great benefit in encouraging past and present students to record briefly and succinctly the results of their powers of observation. I appeal to you, students, and to your forerunners to help us by sending in articles of professional nature. They will always receive full and sympathetic consideration. The College has done so much for you students and I ask you all—past and present—to make this little return to your *alma mater*."

The Forest Commissioner in his address expressed his appreciation of the work done by the Madras Rangers, at least as not behind hand of Dehra Dun Rangers. He hoped that "when the really excellent prospects which the Forest Department offers to young men become better

known to the student class, we may expect even more competition for seats in the College."

He gave the amusing comparision of the ryots in classifying the Forest Department as the bad type of "biting snakes." He wished the students to try and see if they cannot improve matters.

"The Government have for sometime past been seriously considering how they can best improve the relations between the Forest Department and the ryots. Villagers are being made to take interest in the forest protection by the institution of the Forest Panchayat system and the Village Forest Scheme. All measures instituted will be ineffective unless the subordinate staff of the department are imbued with the same spirit. I want you when you become Range Officers to bear this in mind and to try and diminish friction between the ryots and the department. Government is far away and it is by your actions that the ryots must judge the intentions of Government. It is your daily conduct which will make or mar all the schemes for enlisting the co-operation of the ryots."

"It may seem extravagant anticipation to look forward to the day when a Forest subordinate will be looked upon by the villagers as their friend, but we can at all events make a beginning by ceasing to be a nuisance when we go to the villages, and one way of doing this is to see that our visits do not put them to any expense or trouble."

"Another point is the attitude of the Forest Officials to the ryots who are always responsive to good treatment." Penal clauses of the Forest Act should only be resorted to as the last resort when remonstrance and warning prove of no avail. Much of the forest fires would not occur if the relations between the forest subordinate and the ryot had been cordial. If these remarks are borne in mind "when

you become Range Officers, not only will you find your own relations with the villagers more pleasant, but you will be more effiicient Officers and will have more chance of rising to some of the high positions which are open to all of you who do your work honestly and well and in accordance with the wishes of Government without causing unnecessary annoyance to the ryots. I wish you all successful careers."

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The Forest College affords full facilities to the Students of this Province and the neighbouring States to undergo a beneficial course of training in Forestry and allied subjects. The advantages which private students could derive by a course of training have been fully explained in an article (P. 124 No. 3 Vol. 1) of this Journal. The prospects in the Forest Department have been referred to by the Commissioner of Forests. It is not correct to think that the scope in the department is limited. With the development of forest resources and schemes for more concentrated operations and more effectual protection, there will always be an unceasing demand for trained men. Besides, trained men are in great demand from outside the Madras Forest Department.

For information we publish below a list of private students who underwent training in the College and the appointments they have secured after leaving the College.

Private Students.

1913—15 Division.

K. C. Joseph,	M. R. H.	Range Officer,	The Nilgiris.
Y. S. Chennagiraya,	M. R. H.	"	Mysore State.
I. John,	M. R. H.	"	Travancore.
T. V. Oommen,	M. R. H.	"	"
K. S. Ramiah,	M. R. H.	"	South Coimbatore.
T. N. Kochunni Thirumalpad,	M. R. H. with Honours,		(did not seek employment).

1914—16 Division.

M. N. Raman Pillai,	M. R. H.	„ Working Plans duty South Coimbatore.
B. Sambamurthi,	M. R. H.	„ North Coimbatore.
T. S. Narayanaswamy Chetty,	M. R. L.	

1915—17 Division.

V. Mahadeva Iyer,	M. R. L.	Ranger under the Temparory Assistant to the Forest Commissioner.
C. S. Nanjappa,	M. R. L.	Deputy Ranger, 1st grade, Coorg.
K. S. Raghava Char,	M. R. H.	Offered appointment in C. C.
P. V. Ramana Rao,	M. R. L.	

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The 1916-18 batch of students rejoined the College on the 1st August after the vacation. The new batch of students joined the College on the 29th of July. This year there has been no admission of private students owing to lack of seats.

In addressing the students on the reopening of the College, the Principal exhorted them to maintain the traditions of the College. He also told them that they should develop "a Forest eye." Descipline was the key note of success. Self-descipline and self-control are of prime importance before trying to enforce implicit obedience from others. In keeping with the motto of the college "*Mens sana in corpore sano*," great importance is attached to games, athletics, drill and gymnasium. Nothing develops and strengthens character so well as these out door pursuits.

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The college is able to put up good teams for cricket and hockey from the students at present in the college. The following are the games and the results of the matches played after the reopening of the college.

Game.		Played against.	Result.		
14-8-17	Hockey	*vs.*, Police Recruit School,	Lost 1	against	2.
21-8-17	„	*vs.*, Agricultural College,	Won 5	„	1.
28-8-17	„	*vs.*, Police Reserve,	Draw 2	„	2.
19-8-17	Cricket	*vs.*, Agricultural College,	Won 138	„	115. runs.
25-8-17	„	*vs.*, Stanes High School,	Won 202	„	18. runs.

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We learn that the Mysore State has opened a Forest School for training Foresters and Forest Guards. We congratulate the State on its undertaking. It is understood that Sylviculture, Utilization, Botany, Elementary Engineering, Survey, Forest Law and Forest accounts are taught and the training is mainly practical. Sylviculture is taught in Canarese. Trained men would be a great advantage, as such men will take real interest in their work instead of mechanically carrying out orders. Mysore has been attempting to work its forests on a systematic basis for the past few decades and trained men are a necessity.

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We regret to have to announce that none of the four tickets in the Bombay War Fund Lottery purchased by the Madras Forest College Syndicate drew a prize.

The Resources of Madras Forests.

Looking from a commercial point of view one cannot fail to realise about the variety of produce which our forests yield and the scope of work our forests afford in the economic field. The attention of the public has often been drawn to the above and enterprising capitalists have been called upon to take up some scheme of working in developing one or other of the forest industries. The paucity of enterprise

may be due to lack of facilities, to want of knowledge, and also perhaps to want of sufficient enterprising spirit. The industries dependent on the raw forest products are infinitisimal compared with the yield. Such being the case, the Government has to take up the spade work in arranging all preliminaries, and working up definite schemes in regular order, eventually to make over the concern to sure and reliable private enterprise. In a way, it is perhaps but right that Government should start such enterprises at the outset and bring them up to regular working order.

The possible industrial pursuits which are possible are too numerous to mention. Many of the soft-wooded species which have been considered useless, because little is known of their properties at present, are now found fit for making pencils, matches and for the manufacture of paper pulp. The bark of such trees which are felled for timber may on investigation be found suitable to yield good fibre or tannin or dying materials. If such industries are started side by side with timber operations, in localities satisfying all conditions, the entire produce could be utilised without waste and could be worked at good profit.

It is proposed in this article to describe in some detail the scope afforded by the present war in working our forests for the supply of timber for the European countries. We thank Mr. A. W. Lushington C. I. E., Economic Assistant to the Commissioner of Forests for having very kindly permitted us to extract information from his records.

The wilful damages caused by the enemy in cities, towns and villages are too well known. Even forests have not been spared. The enemy has so very maliciously and deliberately denuded entire forest areas of all growth that at present there is not even the soil to grow trees upon. The demand for timber during the war has become very great

and the supply to meet the demand has become a serious question. It is learnt that England (Great Britain is notoriously a poorly wooded country) had to cut over 15,000,000 cubic feet of standing trees to send upwards 9,000,000 cubic feet of sawn timber for stratagic purposes. Again, timber would be required in millions of cubic feet to rebuild habitations, to rebuild towns, factories, machinery and for various other purposes. It can therefore be conceived that the demand for timber in Europe, after the war will be huge while the supply will be totally inadequate.

The woodwork in the houses of the less wealthy in France and Belgium is almost invariably of "Deal" (either "white deal" or Silver fir or spruce, or less commonly "red deal" or pine). These Deals are used for a multitude of other purposes. It is wrong to suppose that the European deal is superior to the same class of woods in India. The prejudice in favour of one species more than another in any place is really due to its being common in that locality. Deals are universally used in Europe because they are the *common* and *cheapest* timber available, not because they are *really good* timbers. The quality of "Deals" vary depending on the conditions under which they grow. The rapidity with which they grow in low situations makes them inferior in quality. The quality of "Red Deal" (Pine or Scotch fir) varies for similar reasons. The pine growing beyond 60° latitude owing to slow and even growth is very homogeneous, little lignified and little resinous, is very easy to work and has no equal in joinery work. The pines growing at some distance from the polar regions have no rival as a mast-wood. These variations in quality also occur in oak, the most important of all European species. It combines in it all the qualities of weight, hardness, elasticity and fibrous nature, it has such durability when employed in air or in water, it can acquire such large dimensions, that it

undoubtedly is the most precious of the European Forest species. It is the timber *par excellence* for all purposes according to its quality. Because of its scarcity and high cost, other species are used for the same purposes, after injecting them with preservative materials.

The number of species in France capable of being used in any way can easily be counted. Some of them are exotic, while others do not attain more than one foot in diameter. Thus the indegenous forest species in France useful for timber is very limited. In the Madras Forests, on the other hand, the number of species is very large. There are hundreds of common species attaining one foot or more in diameter or less than one foot diameter. Great variations referred to in a single species in France do not occur among Madras species. Such are the 3 species of Shoreas and 4 species of Hopea). From a commercial aspect a series of Indian species little known in European markets can be clubbed under one commercial name. Owing to the scarcity of oak and larch, French and other continental nations have reduced to an art the utilization of every species for its most suitable purpose, not because the wood is best suited for the special purpose, but because it happens to be the best wood for the purpose *on the spot*. A large number of Madras species are every whit as good or nearly as good as oak, while several others of the second and third class types are as good as the next best of French species. Again there are about 100 soft woods in Madras, the majority of which, if properly treated would be quite as good as deals and better than birch, aspen and others, all of which have got their modes of utilization. Our soft woods have been hitherto declared as worthless (1) because there are so many better, that there has been no attempt to use them (2) because there has been no attempt to get the best out of them and (3) because there has been no systematic and

scientific attempt to create wood industries in this country on the lines that exist in Europe.

Seasoning :—Though the unseasoned Red Deal is used in cheap buildings in England, as a rule, in Europe they are very particular about the seasoning of timber, more especially in special timber trades such as joiners, cabinet makers, coopers and so forth. In Madras, on the contrary, but little attention is paid to the seasoning of timber; indeed, in many cases it is discouraged either directly or indirectly. It is said that merchants offered a lower rate for the seasoned timber at the Kallayi Mills, Malabar, instead of offering a higher rate, because the wood was not freshly cut for them.

The value of seasoning is very well known. Organic materials such as carhobydrates occur in the cambium layers between the bark and the wood. These promote fermentation, discolouration and rot in wood and could be quickly eliminated by barking logs as soon as trees are felled. Then the logs are totally immersed in water for an adequate period for the solüble organic matter to be removed in solution (water seasoning is better than air seasoning as timber in log dries more quickly after immersion in water). Subsequently the logs are allowed to dry slowly under shade in a free position where air can freely circulate about the logs. Barking prevents discolouration of wood, particularly soft woods. The quick removal of soluble organic materials by total immersion in fresh running water promotes even seasoning. Seasoning under shade, after converting the timber, will facilitate drying as a larger surface is exposed. Rapid drying of the external layers of wood which results in cracks and warping owing to unequal contraction of the outer layers can be reduced to a mininum by slow drying under shade. Soft woods require to be

dried quickly as there is always a far greater tendency to ferment than crack and warp. Therefore it is best to dry them in the hot season. Hard woods on the other hand require to be dried slowly because they have a far greater tendency to crack and warp than to ferment. It is best to start drying in the rains and carry the drying process right through the cold season and the hot weather. If it is found impossible to saw up the log, immediately after the period of soaking required to wash out the fermentable matter, it is best to keep the log, in water, completely submerged, till such time as may be possible to saw it up. With complete submersion under water neither can fermentation set in nor can insects get at the log. Immediately a tree is felled the log should be barked and submerged under water. This is of importance as it prevents depredations of insects and borers which, being fond of saccherine matters, bore through the bark of a felled tree. Though this may be of no avail with insects which bore through the bark of living trees, yet the sooner the log is barked and completely submerged in water, not only is the possibility of fermentation reduced but the chance of attack by insects and borers is also avoided. A comparison of Madras woods with the Phillipine species may here be useful. Some of the former are identical with the latter, while a large number though not identical are exceedingly allied in the nature and structure of the wood. Whereas the Indian species, for instance the Litsæas, are described as useless and their colouring a dirty grey or brown, very similar species of the Phillipines are utilised for various purposes after being so seasoned and their colours are white or pale yellow or pink. Schneider, an American wood expert has given full information in his pamphlet about the process of this seasoning and the reasons and consequences thereof.

Utilization:—In India the standard of utility of timber has been guaged almost entirely by its capacity to furnish material for building. A timber not useful for building (or perhaps for fuel, a vicious waste of good material) has been considered useless. Timber yielding building materials have quite distinct properties. But other properties in timber are ignored though they render it eminently suited for a hundred and one uses to which timber can be put, just as useful as that of building. We see that, in France and other Continental nations, every one of their woods, hard or soft, good or indifferent are utilised. This we do not see in this country. Possibly this may be said to be due to multiplicity of Indian species and the paucity of the European woods. This means that really we have been wasting our wealth in this direction. The difference may be partly due to our not developing wood industries as we should have done. There has been complete apathy in both starting and encouraging small industries. It is found simpler and cheaper to import small wooden articles, such as used in mills in this country for instance, because at present it does not pay to make them here, as the demand for them here is not a tithe of what it is in Europe. But this does not hold good in a large number of cases. In Madras, the utility of wood except as a building material is practically entirely ignored. It is therefore full time that we should find out for what good all our timbers really are. As already suggested, there is now a vast opening before us as a result of war. France and Belgium will not only be devoid of wood (a very sad case) but also of wood in every single one of their wood industries and of all the small woody parts that are required for the machinery of their mills and factories. Now then is the time to exploit our forests for all timber yielding species and send samples of those species, for which we

at present find no use, to those countries after the war, to find out to what uses they could be put to.

With a view to find out their uses, a collection of different soft woods that would be a substitute for "Deals" was started by Government. One tree of each of the different soft woods was felled, seasoned in water as described above and sent to the Kallayi Mills to be sawn into small scantlings and boards to be sent to France as samples, to see whether they would accept any or all of them and at what rates. Though large "advertisement squares" should be sent by preference, the scantlings had to be made small owing to the high rates of the freights ruling. (Compare present freight at 350 shillings a ton with the pre-war charter rates of 20 shillings a ton). It is expected to obtain from 70 to 80 out of the 100 soft-wooded species.

After as many of the soft-wooded species as could be obtained in the South-West part of the Presidency had been collected, a scheme is being considered (1) for sending these soft woods to Europe (*a*) to assist France and Belgium in their rebuilding (*b*) to ascertain the proper uses to which each wood could be put and (2) so as to make it a profitable concern all round. It has been ascertained, on enquiries made, that a consignment of soft-woods alone would not pay and that an admixture of better species also in the consignent could be better handled. The cost of extraction of both kinds of woods would almost be the same, whereas the average value of the consignment would be appreciably greater and make the whole transaction pay. It was therefore suggested that, instead of selecting soft wooded species in the forest, the principle of "clear-felling" the areas to be worked should be adopted.

The experts are of opinion that a project could be evolved which would prove a paying proposition only

provided (1) that both cheap and expensive timber are brought under the scheme (2) that not less than 100,000 cubic feet are available monthly for the saw-mills (3) that timber could be transported by water and can be supplied for a period of at least ten years. (This would mean 6,000 acres in all to be "clear-felled," working 600 acres per year estimating the yield at 40 tons per acre) (4) that the saw-mills be created on the coast at the mouth of the river selected.

It is estimated that 100,000 cubic feet of timber felled would produce only 60,000 cubic feet of sawn timber suitable for the European markets. At least 100 tons per mensem should be available for sale if the scheme should be recognised as a fact in the European markets. It is necessary to provide a full or nearly full load to charter a vessel for carrying the timber.

Floating timber is the cheapest means of transport and a suitable site for the sawmills is important for the same reason.

Items of preliminary work to be undertaken, such as for obtaining a sustained yield, arranging for water transport, choice of site for a mill and so forth are very many to detail here. It would be at least two years before the scheme could be brought into full working order. Large capital expenditure would be necessary during that period, the greatest part of it being for the mill buildings and machinery.

According to expert opinion, none of the soft wooded species should be called or considered "useless". The present first consignment proposed should be considered purely as advertisement samples.

Clearfelling versus Selection. Following the habitual methods of permit-holders and later on the contractors who

selected only one or two species of timber trees suitable for their requirements, the Government have been limiting themselves in the past to the extraction of only the marketable species by selection, thereby rendering themselves petty shop-keepers in contradistinction to wholesale dealers which by rights should have been their proper function. This selection has been termed as "picking out the plums" and is a most deleterious policy. The rusults are apparent. By so doing, better species are gradually exterminated and forests of inferior description are left. This is diametrically opposed to the maxim "Leave to your successors a forest *better* than what you have received from your predecessors" Felling becomes very difficult under the selection method. In a high forest with tall trees, as many trees are ruined as are felled for use. Viewed in this aspect, value realised per cubic foot sold is not the true value of the cubic contents removed. On the other hand, the concentrated operations in smaller areas under supervision, less expert establishment, facilities of transport, facility to re-stock the area by artificial means if natural regeneration is inadequete and improvement of the composition of crops by tending are very apparent when a forest is worked under the clear-felling method. Even if need be, a few isolated mother trees can be left, here and there, *solely* as seed-bearers neither with the idea of keeping them as timber, nor in such a way as would interfere with the main purpose of clear felling.

Turning to the question of finding forests in the Presidency suitable to give a sustained yield, it appears that two areas, inspected so far, seem to be well suited and very nearly satisfy the conditions proposed to be requisite for working. One is on the West Coast. A river is available which will render floating possible throughout the year if improvements are made. From the best species down to the species in the fourth class equivalents to

" Deals " were found in the area inspected so far. The net profits that are likely to be realised by successfully working these forests would seem to justify to permanently improve the river, after closer examination.

The second area is in the South of the Presidency. There is enormous demand for fuel in Tinnevelly. These forests up to the verge of the semi-evergreen sholas are at present worked for fuel. Owing to the rocky bed of the river and the falls, water transport would not be feasible, but a successful transport by road through mechanical appliances is possible. Valuable species such as Hopea, Pterospermum, Aglaia, Hardwickia pinnata, Balanocarpus utilis and Gluta are abundant in the sholas. The possibility in these areas, as ascertained from the average sample plot chosen, worked out to 60 tons per acre of log wood alone over 18″ in diameter. Areas also occur, with greater number of varieties of valuable species yielding at the same time a larger tonnage per acre. From the inspection of these forests, it leads to the opinion that much lesser area of forests would suffice to meet the demand as specified above or a sustained quantity could be supplied for a considerably longer period than 10 years. This opinion goes to justify investment of a far larger capital in permanently improving means of transport, though water transport is impracticable, owing to the unsuitable river and absence of bamboos in these areas for rafting.

All the above calculations have been based taking into consideration the utilization of log-wood only. A considerable amount of revenue could accrue from the poles and branch wood that would be cut at the same time as log-wood. In Tinnevelly, the demand for fire wood and charcoal is very great and every stick of branch-wood would be used for the purpose. It will be possible to start minor industries. For instance, branch wood can be used

for pencils, for matches or for parts of weaving looms and other small pieces of wood-work in machinery or for small packing cases. Charcoal might be made on a scientific basis, whereby not only is charcoal made, but also its by—products—Methyl spirit, Acetone, Acetic acid &c. Then again there is the question of wood paper pulp. A portable boiler to prepare crude material would make the product into a far more portable form. Besides branch wood, many bamboos, canes, reeds, palm leaves, screw pines &c., which abound everywhere could at the same time be prepared into boiled semi-pulp. Still there is the bark amounting to about 17% of the trees removed. Fibre and ropes could be made out of suitable species or tannin could be extracted from such barks as would yield them. All these minor industrials should go a considerable way towards improving the revenue from the scheme. Further it would give excellent scope to start such new industries.

Editor.

Wood Pulp for Paper.

Raw Materials and Manufacture.

Paper is an indispensable article in every day modern life. No transaction is possible without it. It is not only used for writing, for books, daily journals and periodicals, it is in very great demand for a large variety of purposes. It is used in wrapping articles, thin paper ribbons and cardboard boxes for packing, it is corrugated and converted into an elastic and protective medium, handles are made of it for instruments, tools and utensils, it is used as an insulator in electrical industries. Further, important industries are springing up for making twine and yarn as well as cloth and other textile fabrics out of it. Its importance is increasing daily which makes the safeguarding

of cheap and adequate supplies of raw material a very pressing matter.

Supplies of Raw Material.

The raw material for paper at first consisted of linen rags, hemp and jute fibre, waste paper and similar materials; but later came straw, various grasses and finally pulp from wood. Recent experiments made leave no doubt that there are great possibilities of important developments in making paper from certain grasses and bamboo.

Of wood pulp which to-day forms the bulk of the raw material for paper, there are three main groupes—mechanical, sulphite and sulphate—to which may be added pulp similar to the last prepared by the so-called "soda process," which is especially applicable to grasses, bamboo cane and kindred fibres. For the production of mechanical pulp on a competitive basis, abundant and cheap water power is necessary, whereas the other kinds are obtained by processes which require chemicals as well as fuel. The war has seriously affected the supply of the raw material and the prices have gone up very high beyond comprehension.

Imperial Resources.

Raw materials as well as other basic products are available within the British Empire.

In India the possibilities are tremendous, especially when bamboo and certain grasses are taken into account as raw material. Bamboo cane gives quite good pulp when treated properly and as it grows very fast (only three to four years are required for cane to grow to full, suitable size) the supply of raw material from certain area is really much simpler than in the case of wood, the re-growth of which is comparatively slow. The bamboo pulp is very soft and when mixed with wood pulp gives a paper which is almost ideal for printing purposes. India including Burma can supply

bamboo cane in quantities which would ensure raw material for ever and in unlimited quantities.

Efforts to obtain data about the sources of raw material for paper have hitherto been confined within local limits. The importance of the matter is so great that investigations should be instituted on an Imperial basis with the object of concentrating and consolidating all the necessary knowledge and experience, so that authentic and complete data may be available for those interested in developing these new industries.

Manufacture.

The raw material for pulp cannot be used directly in its raw state. The bark will have to be carefully removed from the wood, in a plant properly designed, as it does not contain useful fibre. Further, unless eliminated, it will discolour the pulp and render it less valuable.

The dust produced in cutting wood into chips for chemical fibre should also be removed, as it would otherwise prove detrimental. The same is the case with all grasses. Bamboo again requires different treatment. The cane has to be split and curshed before it enters into the chopper which cuts it into suitable sizes for further treatment and the dust, of which bamboo contains much more than wood, must be carefully removed.

Mechanical pulp.

The mechanical pulp process is used only for wood and is based on the principle of pressing slabs of wood with great force against a sharp grindstone, whereby individual wood fibres are torn away and liberated. When it is feasible, the most economical way is, as a rule, to instal a mechanical wood pulp mill at a waterfall and the plant so arranged that the shafts of the water turbines are directly connected to the grinders. But the question of transport cost has to be

studied with minute care in producing the low priced and half-finished product of this kind. It is sometimes more advantageous to instal the wood pulp mill at a site some distance away from the waterfall. In this case the water power is converted into electricity and transmitted to the mill, where the grinders and other machines are driven by electric motors.

The fine pulp which is produced after a series of processes is collected as thin sheets, cut to size, pressed under hydraulic power to get rid of excessive water and then packed ready for shipment.

The mechanical pulp mill is the simplest factory imaginable and requires no skilled workmen for successful running. The important factors to which attention must be paid are proper transport facilities outside and inside the mill and very strong and reliable machinery.

Sulphite plup.

Sulphite pulp which is made exclusively from wood, gives a strong, easy-bleaching, white pulp suitable for printing paper. This is a chemical process and consists in boiling wood cut into chips of certain length by passing steam under high pressure in very large boilers containg a mixture of lime and weak sulphuric acid. The chemicals required are easily obtainable and the acid is manufactured in separate apparatus at the mill itself.

The wood coming out is a white pulpy mass. It is passed into large storage bins and washed. The pulp then undergoes a series of operations till at last it is made into sheets which are packed in bales for shipment.

The raw materials needed for sulphite pulp are wood, coal, sulphur or pyrites and limestone. Of these, wood and coal are the most important and facilities for transport are dominant factors in the location of a chemical mill.

Sulphate pulp.

The method of producing the sulphate pulp closely resembles the sulphite pulp process, but the boiling liquor used consists mainly of caustic-soda, with various mixtures with sulphur and sulphur salts. These have the quality of dissolving the resin from the wood. In the sulphate method, therefore, various kinds of wood can be used which are unsuitable for making sulphite pulp. Three main qualities produced according to the method of treating the wood are the ordinary soda pulp, easy bleach soda pulp and extra strong soda pulp or "Kraft pulp." It has been found possible to produce paper of extraordinary strength and toughness from the pulp of the last quality and is also used in the fast-growing textile industry.

In this process, the value of products such as acetates, turpentine oil and resin oil are recovered, through a recovery plant attached to the mill, by passing the black residual liquid coming off from the diffusers of the pulp mill. The soda is also recovered from the refuse liquid in a separate apparatus and prepared as a new boiling liquor. Very little fresh raw material is required and consequently the sulphate process is a very cheap one.

Pulp from Bamboo and Grasses.

Fibres from bamboo and grasses are treated with a boiling liquor made up of caustic soda only without sulphur salts. Mr. Rait of the Indian Forestry Department carried out investigations in treating these fibres and established methods wereby these articles may be treated and pulp produced on a commercial scale. By introducing improved methods, the non-fibrous matter contained in them, which originally rendered the pulp inferior, is removed. The plant differs from the wood pulp mills in having two boilers, in the first of which the non-fibrous portion is removed by treating with a weak-solution under low pressure. The

proper treatment of the fibre is done in the second boiler. The spent liquor in the second boiler is used in the first. Waste is thus avoided and the process rendered quite successful commercially.

The pulp finally produced is very much the same as the chemical pulp, with the difference that the bamboo and grass fibres have to be treated rather more gently in special beaters to separte the fibres properly.

General Consideration.

As already stated, proper facilities for transport are of the greatest importance for a successful pulp industry. This point cannot be too strongly emphasised. Pulp is comparatively low-priced article and very bulky, as also is the raw material used for its production. It is therefore necessary, when planning a new pulp mill, to consider all the questions of transport of raw material and finished product most minutely and carefully, even before the technical side is investigated. If the conditions for transport are not favourable, no scheme should be undertaken even though the technical conditions may be very tempting. On the other hand, if the conditions for transport of the wood and other raw material are good and if proper return freights can be obtained for shipping the pulp, enterprises of this kind are attractive, also from a shipping point of view, as they represent a steady and certain freight market which can be arranged for over a number of years.

The scheme should also be investigated from an engineering point of view and the designing and construction of mills should be entrusted to responsible men, so that, the system of working may be thorough, economical and successful.

Editor.

Protection of Sandal.

North Arcot—*versus*—Salem.

The most valuable forest produce, yet known in the Madras Presidency, is sandalwood. Its value is on the increase, and there is every likelihood of its fetching far higher prices year after year, for the fact that the possibilities of Mysore forest have to gradually fall short on account of '*Spike.*'

It will be to the interest of our forest revenue that we increase the out-put of sandal. The possibilities of our forests are so great that, with sufficient establishment and intensive working, the sandal revenue would multiply itself ten-fold in a short time. Within the last 5 years, the revenue on sandal alone has increased from a few thousands a year to many a lakh of rupees; and yet the amount spent for the protection and working is far disproportionate to the revenue realized.

The sandal is well protected on the Javadis of North Arcot, especially the Polur and Santhavasal Ranges, but it is disgraceful in Tiruppattur (old Salem District) and Attur-Kalroyans, Pachamalais and Kollimalais. It is because the very reservation has been taken up in wrong lines in Salem or at least in the case of the hill ranges I have mentioned above.

The dry hill slopes have been reserved in the latter, but the rich sandal plateau have been allowed to be ponakaded and left entirely to the mercy of the Malayalees. On the other hand, the North Arcot Javadis was notified as a whole a reserve, including village site, cultivation, etc., so that ponakad or the brabarous shifting cultivation stopped at once. Then a line was cut round the village excluding the cultivation from the reserve and this bit was

disafforested. Further, the malayalees have been bound over to protect every sandal that is growing in the patta land.

Thus the protection of sandal was ensured beyond any possibility of theft or wilful destruction.

The object of reservation in Salem appears to have been purely climatic, so that the rich sandal forests on the plateau have not been taken into any account. Now we realize the value of sandal and regret the action of our predecessors; I am afraid it is too late to repent. The malayalee has mutilated the rich forest area for raising field crops and the karnam for a small consideration has been instrumental in securing patta. The only forest area that remains untouched is the top of hills sacred to some Deity and there is seen rich remnants of sandal coveted by the forester.

Burnt stumps of sandal are to be seen in large number in the area ponakaded. The malayalee never knew that he was destroying thousands of worth of sandal to raise 1/100 of the value of field crop. The extermination of sandal is being brought to completion even now, and still the Forest Officer sits impotent watching the destruction. Fertile forest areas are given for cultivation on durkhast to the hillmen who pay a nominal value for the tree growth. It is even doubtful if the full amount collected reached the treasury or stops in the karnam's pockets.

The karnam is an honoured annual visitor to these hills where his stay does not extend more than 3 or 4 days.

It may be imagined what amount of work he could turn out in such a short time. The Revenue Inspector naturally never goes up the hill, unless the Collector is on tour there—a very occasional contingency. The Tahsildar

is too high a personage even to follow the Collector up the hills. Hence the plateau forests are entirely managed by the malayalees.

It is high time that such an unsatisfactory state of affairs should cease.

With the Kalroyans it is different; as characteristic of Salem District, only the outer slopes of this hill are reserved; nor could they do better in this case, considering that all the plateau portion are jaghir forests, or rather jaghir land because the destruction of forest has long been completed and the malayalee jaghirdars have little or no forest left. A belt of sandal of all girth classes from 3 feet and below is found along the moist upper slopes bordering the jaghir. They have been subject to the ruthless hacking of scheming Chetties of South Arcot with the aid of malayalees under the cover of jaghir permits. Here again the forest subordinates are handicapped and are unable to do much towards preventing theft.

The jaghirdar sells the right of extracting sandal from his land to the Chetties for a nominal sum and they in turn issue permits to malayalees, who do not mind where they cut so long as they are paid well; thus the engine of destruction is set to work with impunity.

If the forest subordinates are to detect any case, it must be within the reserve. When once it is taken out of the reserve, the offenders can escape law under shelter of jaghir permits. The hill beats are so hopelessly undermanned, that efficient protection is not to be thought of. Spasmodic patrolling by special parties are instituted but with disappointing results; they are unable to identify the offenders and naturally the case falls through.

To crown all, our forest law is so deplorably slack that we are unable to bring to book the originators of this

systematic theft. They are in South Arcot District where Sandal Transit Rules are not in force. It goes without saying that this sandal theft cannot be put down till the market ceases to exist and that could be effected only when the Sandalwood Transit Rules are brought to force over this area. Organised theft of this type cannot be eradicated by punishing few malayalees who are only paid agents of wealthy Chetties, the prime originators of this nefarious scheme.

Vigorous steps are now being taken to stop the frightful depredation once and for all. Radical change for the better may therefore ere long, be expected.

E. W. Dawson,
Range Officer, Attur.

Root parasitism in Sandal.

Of late, there has been a passing change in the angle of vision of Forest officers regarding the degree of parasitism of Sandal. While the general consensus of opinion goes to confirm its obligatory parasitism, there has been a growing conviction, if it is not an optional parasite. An earnest endeavour is here made to solve this perplexing problem in the light of our observations and other well-considered opinions on the subject.

We had the opportunity of studying sandal first hand at Komittuyur and our observation goes to shew that in a seedling about 2 months old, we find the marked development of root hairs, through which it takes up its nourishment from the soil. It was observed in the case of another seedling about 6 months old, that its root had thrown a haustorium on the root of its host, and the development of root hairs not so marked. It thus exchanges its free life

for a parasitic life deriving water and mineral substances from the host plant through the haustoria. As Mr. Barber calls it, it turns out to be, at a very early stage 'a constant and greedy parasite.'

The problem now narrows itself to this—if Sandal, if trained to a state of isolation, could acclimatise itself to its new environment and could have a free existence independent of its hosts. It will now do well to follow the life history of Sandal in the light of well considered opinions of experienced Forest officers.

In his ' Host plants of Sandal,' Mr. Rama Rao points out the inability of pure grown sandal seedlings to grow and develop after the reserve materials stored up in the seed are exhausted. This was found to be the case in 4 separate experiments made in Kurnool by raising seedlings in nursery beds, pottiles, and bamboo tubes. Seedlings unassociated with other species died out when they were about a year old, while those grown with host plants continued to grow vigorously. Further, the failure to raise "Sandal wood plantations as a pure crop in Mysore shews it is not within the bounds of practical sylviculture to raise pure sandal wood plantations. It is out of recognition of this cardinal idea of its root parasitsm that we have carried out dibbling of sandal in cleared strips about 6 feet broad alternating with jungle growth 20' broad from which the sandal seedlings could piece up hosts after the seeds germinate.

Next, it was the experienee of Mr. Pigot, once Conservator of Forests, Mysore that in plantations of Casuarina and Sandal, casuarina trees died off after 25 years and fears were entertained for Sandal after the loss of its companion. Further, we have the testimony of general Rhodes Morgan who says that in the case of the Bylur Sandal plantation

started in 1870 in North Coimbatore weeding and pruning continued till 1889, when the thorny bushes were removed and burnt, and consequent on this injudicious operation, the plantation began to go back.

These facts give incontrovertible proof to the absolute parasitism of sandal, and Mr. Whitehead's illuminating article on 'spike in sandal' throws furthur light on the subject. According to him, if sandal overtaxes one or more of its hosts or foster plants, and finally kills them, the haustoria die off. It is the severence of its connection with the host plants that causes spike in sandal. He goes on to say that the reproduction of sandal, when once established, is prolific, and the area eventually becomes overstocked. Once this is so, the appearance of spike, as he says, is inevitable, as the strength of the foster plants is then insufficient to support the sandal.

In spite of Dr. Coleman's researches in the field of spike in sandal, Mr. Whitehead's theory is very convincing; and if it finds acceptance, I would suggest one line of experiments by leaving one or more foster plants with sandal, and digging a trench round them 2′ deep, and cut off the roots of sandal going beyond tbe trench. This would enable us to find out how many hosts a sandal requires for its growth. Any results obtained in this direction might be of incalculable help in raising sandal wood plantations.

One important experiment is being carried on in Komittiyur to test the degree of parasitism of sandal. It consists in digging a trench around a sandal tree at a radius of 10 feet. It is 3 feet deep and one foot broad, and all the sandal roots going beyond the trench have been cut off. The sandal tree was thus isolated from its hosts in February, 1916, and weeding was also carried out in isolated

areas. No change in the appearance and vigour of the tree was noticed by us in September, 1916.

It is premature to hazard any opinion on the subject. Suffice it to say, that, if it is conclusively demonstrated that sandal is an optional parasite, capable of managing itself in the matter of nutrition, it would indeed be a startling revelation, and would revolutionise all current ideas about the habits of sandal. There are possibilities by which the roots of host plants might go beyond the trench, and sandal enabled its throw fresh haustoria. We may, however await results.

The root parasitism of sandal is one of some antiquity, and experiments analagous to this were made by John Scott in 1871. Among dicotyledons, he examined the root connection of Haptapleurum with sandal. When the sandal roots were cut out, it was distitute of leaves and in an unhelthy condition. After the 4th year, it is said to have acquired fresh vigour, perhaps due to fresh root attachments.

The foregoing arguments prove, beyond doubt, the obligatory parasitism of sandal.

L. A. Krishna Iyer,

Student, M. F. C.

Editorial Note:—We do not agree that the obligatory parasitism of sandal is proved beyond doubt. It is too early yet to come to a final conclusion. It seems pretty certain, however, that to be really thriving the sandal must have a host or hosts.

It would also seem that as Dr. Coleman has succeeded in inducing "spike" by contact the disease is *not* due to severance of root attachments, want of moisture etc. Moreover a disease which appears to be identical with

"spike" in sandal attack a number of other plants which are not parasitic in their habits and this under very varying conditions of soil and climate.

Spike in Sandal.

To

The Editor, M. F. C. Journal.

Sir,

Many of your readers might have gone through this the article by professor Somerville on "effects of grass and certain other plants on the growth of young ash trees" in the Quarterly Journal of Forestry reproduced in the Indian Forester for February 1917. There the professor establishes that the effect of grass on fruit and *other* trees is often so deleterious that the terminal bud often failed to mature and the foliage was stunted and prematurly shed. This deleterious effect was found to be due to a substance produced by the grass roots which acts as poison to the roots of fruit and *most other* trees.

I think this discovery goes in a way to solve the question of 'spike in sandal.' It is now admitted on all sides that sandal is a root parasite in the latter stages at least, though not in its infancy. Therefore, possibly, some of its rootlets suck up this poisonous substance produced by grass roots with the result that they die. When once the rootlets die, much water with mineral salts from the soil is not pumped into the tree and therefore the elaborated carbohydrate or starch manufactured by the leaves, is accummulated without being converted into plastic materials required by the growing tissues, thus resulting in the marked effect on the size of the foliage. This, however, cannot continue for long and in course of time as the poison spreads to the other rootlets the tree ultimately dies.

constructing a club room on a modest scale, if the amount of private contributions is sufficient to justify such assistance.

Situated as far as we are from Coimbatore, a Recreation Room would be a great boon to the students and would help greatly in fostering a healthy spirit (social and intellectual) in the College.

About Rs. 1007 have so far been subscribed. Contributions may be sent to the Principal who will acknowledge the amounts in the columns of the Journal.

The Cowley-Brown Memorial Fund.

From the above article, it will be seen that Rs. 1007 have been so far subscribed for the Cowley-Brown Memorial Fund.

A call has not been made hitherto for the payment of the subscriptions kindly promised. The subscribers are requested to remit their subscriptions to the Principal.

Rs. 237—6—0 have been received and Rs. 162—5—0 have been spent therefrom to make a bromide enlargement of Mr. F. L. C. Cowley Brown. This was one of the aims when the Fund was started. The first object has been achieved and the enlargement is now put up in the Principal's lecture room in the College.

All subscriptions received hereafter and the balance left will be utilised for the construction of the Recreation Room.

We appeal to the past students and to all gentlemen interested in the scheme to be so good as to subscribe for the laudable object and send in their subscriptions at their early convenience.

We are sanguine that our request will appeal to every-one interested and that we will have a good and encouraging response.

C. Srinivasa Rau,
Secretary,
The Cowley Brown Memorial Fund,
The Madras Forest College,
Coimbatore.

Occasional Notes.

The Committee of Management has decided that Donors of Rupees Fifty will be placed on the free list of the Journal whether the issue is monthly or quarterly.

Mr. R. D. Richmond, The Indian Forester and Mr. F. L. C. Cowley Brown are accordingly placed on the free list.

The following gentlemen have lately visited the College and the Museum.

Hon'ble Mr. Buckley, Mr. Stoney, C. I. E., Mr. Morrison with a party of Zamindars.

New roads and gravelled paths are being laid out on the College Estate.

The Senior division is undergoing a gymnastics course of two hours a week.

The following members of the Junior Division have been elected to the House Committee.

1. Krishnan Nair.
2. Narayana Rao.
3. Thayuman.
4. Peddalakshmayya Naidu.
5. D'Sylva.

In future, the House Committee will be distinguished by a special Puggri or Turban.

The College proceeds on its cold weather Tour on the 2nd of October—the Senior division to Komattiyur and the Junior division to Mount Stuart. The divisions will return to Head Quarters on the 4th of November to undergo the Periodical Examination from 5th to 10th November before proceeding to their next camp.

The Principal is now in residence at the College, his bungalow having been practically completed.

Planting on the Estate and in the arboreturm is being taken up. The North side of the Gass Museum has been faced with Trellis for creepers. The nursery is being restored. A special allowance has been sanctioned to the Curator for the supervision of planting operations.

The Vice-President of the Athletic Club has prepared four plots to test the best method of forming an athletic ground. It is hoped that before long the preparation of the Athletic ground and three Tennis Courts will be undertaken.

The pavilion has been completed.

The following have been awarded colours since our last issue.

Hockey.	*Foot-ball.*
G. M. Bartholomeusz.	A. B. Fenn.
C. B. Chengappa.	J. S. Rowland.
Abdul Hameed Khan.	U. K. Thimmayya.
	J. Venugopal Naidu.

On the 6th September, student Narasinga Rao was presented with a bat by the Athletic Committee in

commemoration of his having scored a century--the first yet scored in a College Match.

At the Grigg Memorial sports on the September 1st the following students distinguished themselves.

C. B. Chengappa—Second in ¼ mile and third in 100 yards flat races.

P. K. Parameswaran Pillai—First in the one mile race.

A carpenter's shop has been started. The carpenter's services will be available for private work.

The Book-Stall run by some members of the Staff and the Students at the War Fete on the 18th of August realised Rs. 300.

The Editor will be glad to receive old copies of No. 1 and No. 2 of the Journal.

Quarters for the Engine Driver and the cleaner have been completed and fitted with pipes.

Two sections of the strata on the College Estate. Sixty feet and 120 feet respectively have been framed and hung up in the Principal's room, in the Museum and in the Library.

It is proposed to start a Photographic Club shortly.

It is proposed to form Demonstration forests on the College Estate.

List of contributions to the Gass Forest Museum since July 1917.

Serial No.	Contributions.	Contributor.
1.	Botanical specimen of Vateria indica.	M. R. Ry., Sadasiva Iyer. Avl., D. F. O. Mangalore North.

2. 8 specimens of haustoria of Anacolosa densiflora.	P. M. Lushington Esq.
3. 2 specimens of Coral.	Mr. S. Krishnaswamy Ayyangar, M. F. C.
4. Specimens showing spike in Zizyphus œnoplea, Dodonea viscosa, and lemon grass.	Mr. R. E. Lemos. R. O. Ambasamudram.
5. Botanical specimens of Viburnum punctatum,	E. M. Crothers Esq.

We beg to acknowledge receipt of the following journals.

1. Then and Now.
2. Fettesian.
3. The Mysore Social Review.

Business Columns.

Intending subscribers are requested to note that subscriptions will be accepted from the commencement of a fresh volume. It is impossible to ensure back numbers for those who join our list when a couple of issues of a volume have been published.

We are issuing the No. 1 of volume II of the journal to all our subscribers and request that the annual subscription of Re. 1 be sent to the Manager to save inconvenience. If subscriptions are not received in time the 2nd number will be sent per Value Payable Post.

Subscribers are particularly requested to send in their correct addresses and also any change of addresses to the Editor. We wish to point out that several complaints received that the journals have not been received is entirely due to want of correct addresses.

We assure our subscribers that the journals are promptly despatched at every issue. In several cases we have to refer to the classified list of Forest Officers for addresses in the absence of definite information.

Manager.

Balance Sheet of Accounts of the Madras

Receipts.

Items.	Particulars.	Rs.	As.	P.
1	Subsidy from the Indian Forester	50	0	0
2	Donation from Mr. R. D. Richmond ...	64	0	0
3	Donation from Mr. F. L. C. Cowley Brown. ...	50	0	0
4	Entrance fees from :—			
	i. 24 Imperial Officers and Extra Deputy Conservators at Rs. 10 each. ...	240	0	0
	ii. 23 Provincial Officers at Rs. 5 each. ...	115	0	0
	iii. 148 Subordinate Officers at Rs. 2 each ...	296	0	0
5	Annual subscription from 195 members at Rs. 1 each.	195	0	0
6	Receipts towards advartisement charges. ...	98	5	0
7	Interest accrued on the deposit in the Savings Bank.	8	13	3
8	Sundry receipts.	1	2	6
	Total Rs. ...	1118	4	9

G. Viswanatham,
Treasurer.

C. Srinivasa Rau,
Editor.

Forest College Journal for the year 1916—1917.

Expenditure.

Items.	Particulars.				Amounts. Rs.	As.	P.
I	Printing charges including cost of paper :—						
	i. Stationery.	4	15	0			
	ii. Cost of printing circulars.	I	12	0			
	iii. ,, wrappers. ...	12	8	0			
	iv. ,, four issues of Journals.	386	13	9	406	0	9
2	Cost of making printing blocks. ...				2	10	0
3	Postal charges :—						
	i. Incurred by the press in despatching Journals ...	33	3	6			
	ii. Incurred by the Editor in despatching Journals and Correspondence. ...	22	11	6	55	15	0
4	Charges incurred in packing Journals for despatch				5	2	9
5	Conveyance charges :—						
	i. Jutka charges incurred by the Editor to the press ...	I	10	0			
	ii. Trainage incurred by the Editor to proceed to Coimbatore from Camp on Journal work ...	2	4	0	3	14	0
6	Advance made to the press for purchasing stock of paper.				75	0	0
	Total Rs. ...				548	10	6
	Add amount deposited in the Savings Bank including the interest accrued on the deposit.				508	4	3
	Add cash balance with the Treasurer on 11-9-17.				61	6	0
	Total Rs. ...				1118	4	9

F. Cowley Brown,
President.

E. M. Crothers,
Manager.

Forecast of probable Receipts and Expenditure during 1917—1918.

Probable Receipts

Items.	Particulars.	Rs.	A.	P.
1	Annual subscriptions from 195 members. ...	195	0	0
2	Advertisement charges.	100	0	0
3	Entrance fees from 30 additional members at Rs. 2 each	60	0	0
4	Annual subscriptions from 30 additional members.	30	0	0
	Total Rs. ...	385	0	0

Probable Expenditure

Items.	Particulars.	Rs.	A.	P.
1	Printing four issues of Vol. II. of the Journal and all charges connected therewith ...	550	0	0
	Total Rs. ...	550	0	0
	Expected receipts during the year	385	0	0
	Annual deficit Rs. ...	165	0	0

Note:—Forecast of expenditure based on the actuals of 1916—1917.

Gazette Notifications.

June 5, 1917.

Mr. Francis Loftus Cowley-Brown, on return from leave, to be Principal of the Forest College, Coimbatore.

Mr. Cecil Ernest Claude Fischer, Deputy Conservator and Principal Madras Forest College, Coimbatore, to be District Forest Officer Nellore, vice Mr. H. F. Arbuthnot deceased.

D. V. Krishna Rao, Deputy Ranger, third grade, Upper Godavari is posted to act as Ranger, sixth grade, with effect from date of taking over charge of the Cherla range i, e., 23rd March 1917.

M. R. Ry., C. D. Parthasarathi Chetti, ranger fourth grade, is granted extension of leave on medical certificate for three months from 26th April 17 in continuation of the leave granted to him in service order No. 41, dated 14th April 1917.

June 12, 1917.

1. M. R. Ry., K. M. Gopala Achari, Ranger IV grade, in charge of Palnad range, Guntur District, is granted privilege leave on medical certificate for six weeks from date of relief (afternoon of 26th May 17).

2. M. R. Ry., B. K. Krishna Rao, Ranger IV grade in charge of Vinukonda range, Guntur district, to be in charge of Palnad range in addition to his own, vice No. 1 on leave.

The following men are confirmed as Rangers VI grade from 1st May 1917 to fill up the existing vacancies.

(1) P. S. Varadakrishnamachari, M. R. H., Deputy Ranger 1st grade and acting ranger VI grade, in charge of Sriharikota range, Nellore district,

(2) B. V. Vaideswara Iyer, Deputy Ranger first grade and acting Ranger VI grade in charge of Bukkapatnam range, Anantapur district.

(3) M. Krishna Iyer, Deputy ranger first grade and acting Ranger VI grade in charge of Vempalli range, West Cuddapah district.

(4) L. Govindasami Pillay Deputy Ranger second grade and acting Ranger V grade in charge of Chittoor Range, Chittoor District. The appointments of Nos. 3 and 4 are subject to the approval of the Board.

M.R. Ry., G. Rama Rao Ranger, fourth grade sub-protem in charge of Harpanhalli range, Bellary District, to hold charge of Kudligi range, as a temporary measure in add itition to his own, till he is relieved by

C. S. Ramanathan, Deputy Ranger, second grade, on return from Madras Forest College.

M. R. Ry., G. Rama Rao, Ranger, fourth grade sub-protem Bellary district is reverted to his permanent post in fifth grade with effect from 1st June 1917.

G. D. David, Deputy Ranger 3rd grade Upper Godavari, is dismissed from Government service as he was convicted, under section 409, Indian Penal Code, in C. C. No. 8 of 1916 on the file of the joint Joint Magistrate, Bhadrachalam, which conviction was upheld on appeal.

The following postings and transfers of rangers and deputy rangers are ordered :—

(1) A. Subramaniya Iyer, now at the Madras Forest College to Owk range, Kurnool South.

(2) B. Gulam Destagiri, to Berhampur range, Ganjam district.

(3) K. Tiruvenkatachari, to Gundalabrameswaram range, Kurnool West.

(4) A. Manikka Mudaliar, to Cherla range, Upper Godavari.

(5) Mr. S. A. Dawson, Pecheruvu range Kurnool West.

(6) M. R. Ry., A Rama Hebbar, on expiry of the privilege leave for one month and fifteen days granted to him is posted to Bandar range, Kistna distsict.

(7) M. R. Ry., C. Ramasami Naidu, Ranger 3rd grade, on expiry of privilege leave for three months granted to him is posted to the Dhone range, Kurnool West.

M. R.Ry., C. Ramasami Naidu, Ranger 3rd grade Upper Godavari is granted privilege leave for three months with effect from date of relief. Range Officer Marrigudem will be in charge of Palusumamidi range also in addition to his own.

M. R. Ry., B. Krishnaswami Rao M. R. H., Ranger, fifth grade, Kurnool West, is transferred to Upper Godavari for the charge of the Pulusumamidi range.

M. R. Ry. T. G. Sankaran Nair M. R. Honors, Range Officer Polur is granted privilege leave on medical certificate for three months from date of relief.

M. R. Ry., G. N. Subba Rao, Probationary Ranger, is posted to the Polur range temporarily until he is relieved by

S. M. Srinivasagam Pillay posted to this range in S. O. No. 53 dated 1stMay 1917.

The combined leave for seven months granted to M. R. Ry., N. Swaminatha Iyer, Ranger 2nd grade, in S. O. Nos. 147 of 16 dated 13th October 16 and 9 of 1917 dated 24th January 1917, is extended by two months.

A. G. Jesudasan Pillay, Acting Ranger, sixth grade, South Malabar, is granted privilege leave for one month with effect from 15th June 1917 or date of relief.

June 19, 1917.

M. R. Ry., George Venugopal Avergal, District Forest Officer, West Vellore, to be also Deputy Collector in the North Arcot district.

M. R. Ry., K. Gajaraja Mudaliar, Extra Assistant Conservator of Forests, working under the District Forest Officer, South Coimbatore, will be considered to have been on privilege leave for three days from the 23rd to the 25th December 1916.

M. R. Ry., A. Hanumantha Rao, Extra Assistant Conservator of Forests, on probation, to act as District Forest Officer, Nellore, until relieved by Mr. C. E. C. Fischer.

Under article 260, Civil Service regulations, the Board grants privilege leave for one nonth to M. R. Ry., A. Raju Naiyaker, District Forest Officer Vizagapatam, from date of relief.

Mr. D. A. Stracey, Extra Assistant Conservator of forests, will be in charge during M. R. Ry., A. Raju Nayaker's absence on leave.

The one month's privilege leave on medical certificate granted to M. R. Ry., T. K. Ramaswami Ayyar, Ranger 3rd grade North Cuddapah District is extended up to 4th July 1917. The existing arrangements to continue.

Mr. Syed Munavar Sahib M. R. H., Ranger 6th grade, south Salem division, is granted privilege leave for twenty days from 28th May 1917 or from date of relief.

M. R. Ry., C. P. Garudachala Mudaliar, Ranger, 4th grade South Coimbatore is granted twenty days' privilege leave with effect from the 16th June 1917 or from date of relief.

A. Nicholas, M. R. H., Ranger 5th grade, working-plans duty is granted privilege leave under article 260 of the Civil Service Regulations for the period from 18th March to 16th June 1917.

June 26, 1917.

The leave without allowances for two months granted to Mr. W. S. Fernandez, Ranger, Kristna District is extended by four months' leave on medical certificate.

The following transfers of Rangers in Ganjam district are ordered :—

M. R. Ry., B. Punniah, Ranger, 5th grade, from Mojjagoda to Bontha range.

Mr. C. S. King, from Bontha to Mojjagoda range.

V. Jaganatham Pillai, Deputy Eanger, 1st grade, Anantapur district is appointed to act as Ranger, 6th grade, with effect from 18th May 1917 afternoon, viz., S. M. Razvi Sahib appointed as Assistant Instructor, Vernacular Training School and is posted to Kalyandrug range of the same district till his relief by Deputy Ranger P. Dhananjaya Rao, on return from the Madras Forest College early in July 1917.

Mr. J. M. Abraham, Ranger, 4th grade in charge of Adoni range, Bellary district is granted privilege leave for fifteen days from 10th to 24th July 1917, both days inclusive.

M. R. Ry., T. Subbarayalu Nayudu, Ranger 2nd grade, Madanapalli range, Chittoor district is granted privilege leave for one month, with effect from or after the 5th August 1917.

2. Mr. S. M. Razvi Sahib, 5th grade, now doing duty as Junior Instructor at the Vernacular Training School for 1917, is at the close of the school session, i. e., at the end of July 1917, posted as a temporary measure to the charge of Madanapalli range in relief of No. 1.

July 3, 1917.

Mr. Francis Loftus Cowley Cowley-Brown to be Deputy Conservator of Forests with effect from the date on which he assumed charge of the post of Principal of the Forest College, Coimbatore.

Mr. Hugh Alison Latham, Duputy Conservator of Forests, to be Conservatcr of Forests, third grade sub-protem, with effect from 21st May 1917.

In modification of this office service order No. 143 dated 6th October 1916 accepting the resignation of M. R. Ry., B. Sanniah, ranger 4th grade, he will considered to have been on furlough from 26th October 1916 to 4th June 1917, both days inclusive, and permitted to rejoin duty on 5th June 1917.

1. M. R. Ry., M. Muthuswami Ayyer, ranger 3rd grade is transferred from West Vellore to South Salem District for the charge of Salem East Range. To join at once.

2. On relief by No. (1) M. R. Ry., L. R. Narayana Ayyer, Ranger 3rd grade, is transferred from South Salem to Madura for the charge of Cumbum range, vice., S. Venkatasuwami Nayudu, temperary ranger 6th garde who reverts to Tinnevelly District.

3. M. R. Ry., T. G. Sankaran Nayar, Ranger 3rd grade sub-protem, is on return from privilege leave, transferred from South Vellore to West Vellore, for the charge of Tiruppatur range.

4. S. M. Srinivasagam Pillai, deputy ranger 2nd grade, is, on return from the Forest College, to hold charge of Tiruppatur range until No. 3 joins.

This cancels Srinivasagam Pillai's posting to Polur range ordered in this office Service Order No. 53 of 1917 dated 1st May 1917.

On the closing of Vernacular Training School M. R. Ry., A. K. Kandan, Ranger M. R. H. 5th grade, is posted to Polur range South Vellore District.

M. R. Ry., T. V. Govinda Row, acting Ranger sixth grade is posted to the Cuddalore range, South Arcot District.

M. R. Ry , R. Guruswami Ayyer, ranger 1st grade South Mangalore division, is granted privilege leave under article 260 of the Civil Servicc Regulation for two and a half months from 1st July 1917 or date of relief.

R. Rama Ayyar, Deputy ranger 2nd grade to be in charge of Kasaragod range during the period S. Srinivasa Rau, M. R. H deputy ranger 2nd grde or acting ranger, sixth grade to be ranger sixth grade with effect from 29th June 1916.

M. N. Raman Pillai, M. R. H. Probationary Ranger 6th grade to be Ranger, 6th grade with effect from 10th August 1916.

B. Sambamurthi Ayyar M. R. H. Probationary Ranger 6th grade, to be Ranger, 6th grade with effect from 1st September '16.

K. Venkataramanan M. R H. Deputy ranger, 1st grade to Satyamangalam range, North Coimbatore.

C. Karunakara Menon, student Forest College M. R. H. to Sankaranarayana range, Mangalore North.

M. Rama Rao Kine, M. R. H. Deputy ranger 2nd grade to Uppinangadi range, Mangalore South.

P. Karunakara Menon, M. R. H. student Madras Forest College to Coonoor range, Nilgiris.

July 10, 1917.

M. R. Ry., T. M. Duraiswami Pillai, Head Clerk District Forest Office Chinglepet District on Rs. 40—2—50, is appointed to act as Ranger, 6th grade, on probation for 6 months and is posted to Chinglepet District in connection with the introduction of the Kancha grazing system into that district.

The leave on medical certificate for six months granted to Mahammed Asadulla Ghatela in the Office Service Order Nos. 17 and 37 of 1917 is extended by 3 months and Deputy ranger K. T. Venkatachari, will continue to act for him pending further orders.

1. M. R. Ry., N. L. Narasimham ranger 4th grade upper Godavari is granted privilege leave for 3 months with effect from date of relief by D. V. Krishna Rao.

2. D. V. Krishna Rao, on relief by A. Manikka Mudaliyar, M. R. H. is posted to Lakkavaram range to relieve No. 1.

The following revision of postings of Deputy rangers coming out of Madras Forest College is ordered :—

A. Manikka Mudaliar M. R. H. to Gundalabrahmeswaram range, Kurnool west.

K. Tiruvenkatachari M. R. L. to Pecheruvu range, Kurnool West.

S. A. Dawson, M. R. L. to Lakkavaram range, Upper Godavari.

This cancels the postings of the above three to Cherla, Gundlabrahmeswaram and Pecheruvu ranges respectively.

M. R. Ry., S. M. Krishnaswami Ayyar, ranger 4th grade, Ambur range, North Vellore division, is granted two months privilege leave from date of relief by K. Jayaram, M. R. H. returning from the Forest College, Coimbatore.

July 17, 1917.

The six weeks privilege leave granted to M. R. Ry., K. M. Gopalachari, Ranger 5th grade Palnad Range, Guntur District in this Office Service Order No. 71 of 1917 dated 31st May 1917 is extended by a week, that is up to the end of 14th July 1917. The existing arrangements already ordered will continue.

M. R. Ry., L. S. Krishnan Avergal, Probationary Extra Assistant Conservator of Forests, is transferred from Madura to Tinnevelly to work under the order of the District Forest Officer.

M. R. Ry., K. Ramaswami Ayyar, Ranger 2nd grade, the Nilgiris is granted combined leave for 6 months privilege leave for 3 months and furlough for 3 months) with effect from the date of relief from Coonoor Range.

The following appointments of Rangers are ordered with effect from 30th June 1917.

P. K. Karunakara Menon, M. R. H. to act as Ranger 6th grade sub-protem.

K. Venkataramanan, M. R. H. Deputy Ranger 1st grade to act as ranger 6th grade sub-protem.

C. Karunakara Menon, M. R. H. to act as anger 6th grade sub-protem.

M. Rama Rao Kini, M.R. H. Deputy Ranger, 2nd grade to act as Ranger, 6th grade sub-protem.

E. T. Ramapuram, Deputy Ranger 2nd grade and acting Ranger 6th grade is transferred from Mangalore South division to Mangalore North division to take charge of Mangalore Range.

M. R. Ry., N. Swaminatha Ayyar, Ranger 2nd grade, Nilgiris, on combined leave, is posted to Bhavani range, North Coimbatore on return from leave.

Mr. R. Mitchell, Probationary Extra Assistant Conservator, the Nilgiris, is transferred to Working plans duty under the District Forest Officer, South Coimbatore. To join expeditiously.

24th July, 1917

Mr. V. T. Staggs, ranger 3rd grade, lower Godavari, is granted privilege leave for three months with effect from date of relief.

M. R. Ry., S. Ramaswami Ayyar, ranger 1st grade on return from leave is posted to Gokavaram range, lower Godavari, to relieve No. 1. This cancels the posting of ranger Ramaswami Ayyar to Berhampur.

M. R. Ry., V. P. Narayana Menon, ranger, 4th grade, in charge of Badvel range, North Cuddappah Distrlct is granted privilege leave for one month with effect from date of relief.

M. R Ry., Sidha Pillai, ranger 5th grade in charge of Porumamilla range of the same district to hold charge of Badvel range in addition to his own in relief of No. (1).

The privilege leave for one month and fifteen days granted to ranger A. Rama Hebbar in Service Order No. 77 of 1917, dated 5th May 1917, is extended by fifteen days.

T. E. Varadachari and C. T. Tiruvengadam, Supernumary rangers, sixth grade, on probation, are confirmed as rangers, sixth grade, in the regular line in the above order.

M. N. Raman Pillay, ranger, 6th grade on Working Plans duty, is granted leave on medical certificate, under article, 336 of the Civil Service Regulations, for two months with effect from 11th July 1917.

July, 31st 1917i

(1) M. R. Ry., V. N. Seshagiri Rao, sub-protem ranger, first grade, Chittoor District, and Senior Instructor, Vernacular Training School, 1917, Central Circle, is granted privilege leave for one month with effect from or after 5th August 1917.

M. R. Ry., L. Govindaswamy Pillay, Deputy ranger, 2nd grade appointed to act as ranger 6th grade, in this Office Service order No. 30, dated 2nd March 1917, will continue to act, vice No. (1) on leave and to be in charge of Chittoor range.

M. R. Ry., V. N. Seshagiri Rao, ranger 1st grade sub-protem, is on return from leave, posted to the charge of Chalama range, Chittoor District.

M. R. Ry., T. V. Subba Rao Nayudu, ranger 6th grade, on expiry of his suspension is posted to Ganjam District for duty.

Deparmental Test--Notification dated 7th July 1917, page 1164 Part II, dated 17th July 1917 publishing the results of the Forest Departmental Examination held in January 1917.

All the candidates have passed in the second class.

August 7, 1917.

The fifteen days' privilege leave granted to Mr. J. M. Abraham, Ranger, 4th grade, Bellary District, in this office Service Order No. 95 of 17 dated 23rd June 1917, will take effect from 11th July 1917 (afternoon) instead of 10th July 1917 (forenoon).

The following Deputy Rangers who came out of the Madras Forest College course of 1915—17 with Higher Standard Certificates, are appointed as Acting Ranger sixth grade from 1st July 1917:—

1. C. S. Ramanathan, M. R. H.
2. D. E. Lewin, M. R. H.
3. P. Dhananjaya Rao, M. R. H.
4. T. Paramasivam Pillai, M. R. H.

W. A. Mekkeri Sahib, ranger, 4th grade, is granted combined leave for six months, i. e., privilege leave for fourteen days and leave on medical certificate for the remaining period from date of relief.

M. Amir Padshah, Acting Ranger 6th grade is transferred from North Salem to South Salem for the charge of Pappireddipatti range

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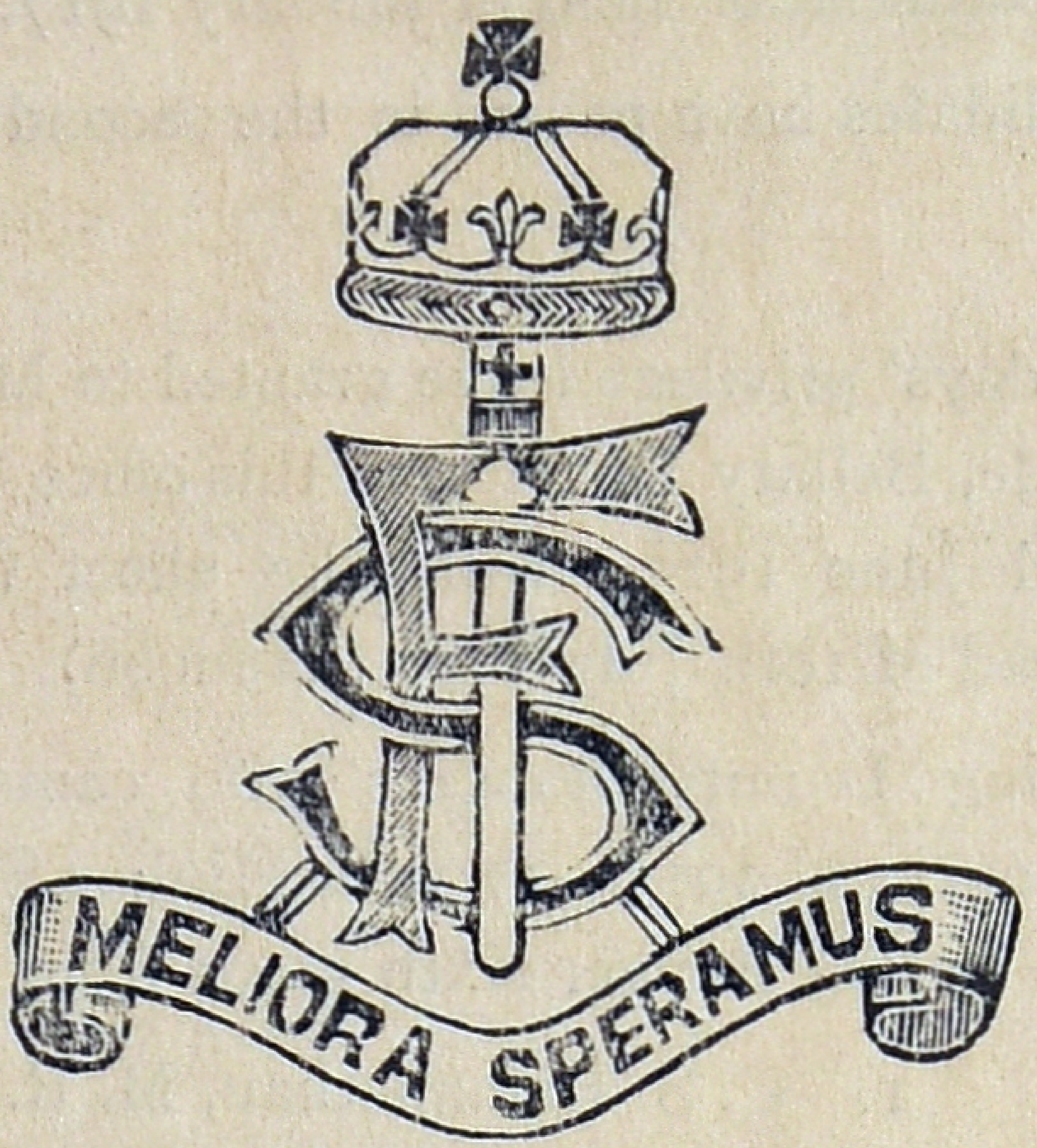

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